Skilled delivery care service utilization in Ethiopia: analysis of rural-urban differentials based on national demographic and health survey (DHS) data

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Abstract

Background: Despite the slight progress made on Antenatal Care (ANC) utilization, skilled delivery care service utilization in Ethiopia is still far below any acceptable standards. Only 10% of women receive assistance from skilled birth attendants either at home or at health institutions, and as a result the country is recording a high maternal mortality ratio (MMR) of 676 per 100,000 live births (EDHS, 2011). Hence, this study aimed at identifying the rural-urban differentials in the predictors of skilled delivery care service utilization in Ethiopia.

Methods: The study used the recent Ethiopian Demographic and Health Survey (EDHS 2011) data. Women who had at least one birth in the five years preceding the survey were included in this study. The data were analyzed using univariate (percentage), bivariate (chi-square) and multivariate (Bayesian logistic regression).

Results: The results showed that of the total 6,641 women, only 15.6% received skilled delivery care services either at home or at health institution. Rural women were at greater disadvantage to receive the service. Only 4.5% women in rural areas received assistance from skilled birth attendants (SBAs) compared to 64.1% of their urban counterpart parts. Through Bayesian logistic regression analysis, place of residence, ANC utilization, women’s education, age and birth order were identified as key predictors of service utilization.

Conclusion: The findings highlight the need for coordinated effort from government and stakeholders to improve women’s education, as well as strengthen community participation. Furthermore, the study recommended the need to scale up the quality of ANC and family planning services backed by improved and equitable access, availability and quality of skilled delivery care services.

Key words: antenatal care, differentials, skill birth attendance, delivery service

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Background

Pregnancy is often a defining phase in a woman’s life, and it can be a joyful and fulfilling period for the mother and father both as an individual and as a member of society. However, it can also be a period of misery and suffering and it can be a joyful and fulfilling period for the mother and father both as an individual and as a member of society. Health, such as obstetric fistulas. It is estimated that 100,000 women suffer with untreated fistulas across the country and another 9,000 women develop fistula every year which is mainly caused by obstructed labor and lack of maternal health care.

Consequently, in Ethiopia, the observed change in maternal mortality is very low and there is a need to accelerate the decline in mortality in order to achieve the MDG of reducing maternal mortality by two third. The maternal mortality rate was estimated to be 676/100,000 according to the 2011 EDHS. The annual percentage change is only -4.2, which puts the country off-track but still in the category of “making progress” towards the target set under MDG-5.

Furthermore, the challenges of maternal mortality and morbidity in the country are aggravated by the underutilization of skilled delivery care services. According to Ethiopian demographic health survey (EDHS), 2011 report, only ten % of births in Ethiopia are delivered with the assistance of skilled birth attendants. Nine women in every ten deliver at home, i.e., only ten % of births were assisted by skilled service providers, and 57 % of births were assisted by relatives, or some other persons. Twenty- eight % of births were assisted by traditional birth attendants, while 4 % of births were unattended.

The very few case studies conducted indicated that a number of individual, household and institutional characteristics affect women's decisions of seeking delivery care, which includes education, income, accessibility, age, organization and functioning of the health care system and services, interaction between parents and health workers, waiting time and clinical practice. Mengistu and James, in their study in the Arsi Zone of central Ethiopia, found maternal age, parity, lack of time, education, marital status, and women’s economic status to be significant predictors of utilization of maternity care.

A study in Yirgalem Town and in the surrounding Southern Nations, Nationalities, and People’s Region (SNNPR) of Ethiopia showed that women’s education, inadequate household income, and unwanted pregnancy were important predictors of antenatal and delivery care utilization. A recent study conducted in Southern Ethiopia identified that women’s age, work status, literacy status, children ever born, and exposure to media (frequency of listening to radio) were the key predictors of delivery service utilization. There could be due to direct obstetric causes such as hemorrhage, abortion, sepsis, and ruptured uterus and hypertensive diseases of pregnancy. Possible explanations for these deaths in developing regions are the inadequate access to modern health care services and the poor use of these services.

Skilled attendance during pregnancy and early post natal checkup are the most appropriate interventions in preventing maternal death and will help in attaining the Millennium Development Goal (MDG 5), which aims at improving maternal health, and has specific targets of reducing the maternal mortality ratio by three quarters between the years 1990 and 2015, and to have more than 85% of deliveries assisted by skilled attendants globally by 2010 and 90% by 2015 (Starrs, 2006 and UN, 2011).

In developed countries, WHO estimates skilled attendance to have reached 99.5%. In developing regions, the proportion of deliveries assisted by skilled health personnel rose from 55 % in 1990 to 65 % in 2010. The regions with the lowest proportions of skilled attendants are birth are Sub-Saharan Africa (45%), Middle East and Southern Asia (49%), which also had the highest number of maternal death. In every region, the presence of skilled birth attendants is lower in rural than in urban areas.

The health care system in Ethiopia is among the least developed in Sub-Saharan Africa, and is not, at present, able to effectively cope with the significant health problems the country is facing. The government of Ethiopia issued its health policy in 1993, which emphasizes the importance of achieving access to basic primary health care services for all segments of the population. The HSMP has also given a great attention to maternal health by recognizing the importance of the use of assistance from skilled personnel during delivery. The weak organization and performance of the health services due to lack of trained personnel, lack of basic equipment and poor referral linkage can be taken as possible reasons for the low utilization of maternal health services. This creates a challenge to improve maternal health.

In Ethiopia, an estimated 2.9 million women give birth every year. Of these, approximately over 25,000 women and girls die each year and more than 500,000 suffer from serious injuries and permanent damage to their health, such as obstetric fistulas.
also be many other factors that can explain why women prefer not to utilize necessary health services during pregnancy.

To the best knowledge of the authors, the very few studies conducted previously were either based on small sample or small segment of a population or were based on secondary data available in health facilities. This study therefore examined the rural urban differentials in the predictors of skilled delivery care service utilization in Ethiopia based on 6641 women.

Conceptual framework

The behavioral model adopted from Anderson et al. "provides a framework for understanding the potential influences on an individual’s decision to make use of the available health services. The model suggests that the use of health services is a function of the predisposing to use the services, and is a factor that enables or impedes the use and need for the service. The purpose of the model is to discover the conditions that either facilitate or impede utilization of the service.

The model is depicted in Figure 1 and consists of four main model components. The first component consists of the health care system including national health policy and the resources and their organization in the health care system. It also pays attention to the external environment, which includes the physical, political and economic elements. The second component consists of three major elements; predisposing characteristics, enabling resources, and need. (See figure 1 below).

Methodology of the study

The Study Setting

The Federal Democratic Republic of Ethiopia has nine Regional States, two city administrations, 611 Woredas, 247 urban and rural districts and 15,000 Kebeles. Regions are divided into zones, and zones into administrative units called weredas. Each woreda is further subdivided into the lowest administrative unit called kebele (Population Census Commission, 2008).

Ethiopia is the second most populous nation in Africa next to Nigeria. The third census conducted in 2007 revealed that the country has a total population of 74 million. Of these, 50.8% are males and 49.2% are females and a large proportion of women (24%) were in the reproductive age (15-49 years).

Ethiopia is one of the world’s poorest countries. The country’s per capita income of US$370 is substantially lower than the regional average of US$1,257. The government aspires to reach middle income status (current threshold: US$1,025) over the next decade. The recent economic growth brought with it positive trends in reducing poverty, in both urban and rural areas. While 38.7% of Ethiopians lived in extreme poverty in 2004-2005, five years later this number was reduced to 29.6%, which is a decrease of 9.1%.

Source of Data, Instruments of Data Collection and Sampling design

This study is conducted based on the national EDHS 2011 which was carried out under the guidance of the Ministry of Health (MOH) and was implemented by the Central Statistical Agency (CSA). The survey is part of the worldwide Demographic and Health Survey (DHS) program, which is designed to provide information on population, family planning, and health. The 2011 EDHS is the third demographic and health survey conducted in Ethiopia since 2000.

The 2011 EDHS used three questionnaires: the Household Questionnaire, the Women’s Questionnaire, and the Men’s Questionnaire. These questionnaires were adapted from model survey instruments developed for the MEASURE DHS project to reflect the population and health issues relevant to Ethiopia. Issues were identified at a series of meetings held with various stakeholders.

The components of maternal health care covered in the survey included antenatal care, delivery and postnatal care. Women aged 15–49 who gave birth within five years preceding the survey were asked information on utilization of skilled delivery care services. If the woman had more than one child in the five years preceding the survey, the information on the use of delivery assistance was collected for the last birth.

The EDHS is basically a descriptive cross-sectional survey which employed quantitative research methods. The sample for the 2011 EDHS was designed to provide population and health indicators at the national (urban and rural) and regional levels. The sample design allowed for specific indicators to be calculated for each of Ethiopia’s 11 geographic/administrative regions (the nine regional states and the two city administrations).

The 2007 Population and Housing Census, conducted by the CSA provided the sampling frame from which the 2011 EDHS sample was drawn.

The 2011 EDHS sample was selected using a stratified, two-stage cluster design and EAs were the sampling units for the first stage. The sample included 624 EAs, 187 in urban areas and 437 in rural areas. Households comprised the second stage of sampling. A complete listing of households was carried out in each of the 624 selected EAs from September 2010 through January 2011. Sketch maps were drawn for each of the clusters, and all conventional households were listed. The listing excluded institutional living arrangements and collective quarters (e.g., army barracks, hospitals, police camps, and boarding schools).

A total of 17,817 households were selected for the sample, of which 17,018 were found to be occupied during data collection. Of these, 16,762 were successfully interviewed, yielding a household response rate of 98%. 17,385 eligible women were identified for individual interview and complete interviews were conducted with 16,515 women, yielding a response rate of 95%. In this study, visitors were excluded and only women who gave birth in the past five years preceding the survey were included. As a result, the analysis of this study was carried out using 6,641 women because the sample is not self-weighted at the national level, all data in this report are weighted unless otherwise specified.

Variables in the Study

In the 2011 EDHS, the respondents (ever-married women aged 15-49) were asked questions regarding their last birth that occurred in the five years preceding the survey as to who assisted them with the delivery. From this specific question, dichotomous variables were created for this study. It was coded as 1 if the woman received assistance at delivery from SBAs including qualified Doctor, Nurse or Midwife, and 0 if otherwise.

Based on the Andersen’s behavioral model of the use of health services, twelve independent variables were included in this study: nine variables from predisposing factors, two from enabling factors and one from personal health practices (ANC utilization).

Method of Data Analysis

Data cleaning and management were carried out using STATA, Version 12. Variables were re-coded to meet the desired classification. The study employed...
univariate, Bivariate and multivariate analysis. Univariate analysis was carried out to describe women’s demographic and socio-economic characteristics. Bivariate analysis was used to see simple association between the dependent and explanatory variables. Further, because of the complexity of relationships between the dependent and independent variables, multivariate analysis in a form of Bayesian logistic regression was also employed. To estimate the effect of the indicator variables on the outcome variable, Odds ratio (OR) and 95% confidence interval (CI) were computed.

**Results**

**Background Characteristics**

There were 6,641 women included in this study. An overwhelming majority of the respondents were rural residents, consisting of 81.4% of the total respondents, and the rest 18.6% were from urban areas. As indicated in table 1, the highest proportions of women were from Omoiya (14.7%), while the least proportion of women were included from Addis Ababa (4.3%). In the overall sample, almost half (50%) of women were in the age group 25-34 years old. The majority of the women (56.1%) in urban areas had one or two children. Conversely, relatively higher proportion (39.1%) of women in rural areas gave birth to 3-5 children (Table 1).

The majority of women in the overall sample had never been in school (67.9%). Notable variations in attending school was observed between rural and urban women. Accordingly, 75.8% of women in rural areas have never been to school compared to 33.2% of women in urban areas. With regard to their wealth index, the results of Univariate analysis in table 1 showed that most women were in the poorest wealth quintile, accounting for almost 30%. Women in urban and rural areas who belong to the poorest wealth quintile were 4.2 and 35.5%, respectively (Table 1).

Urban-rural disparity with respect to women’s occupation showed that almost 42% of women in urban areas engaged in skilled work compared to 19.6% of their rural counterparts. With respect to ANC utilization, it is observed that 55.2% of women didn’t receive ANC. Notable variations in ANC utilization between women in urban and rural areas were observed. Accordingly, 81.5% of women from urban areas received ANC compared to 36.4% of women in rural areas (Table 1).

**Results of Bivariate Analysis: Levels of Skilled Delivery Care Service Utilization**

This section presents the rural-urban socio-economic and demographic differentials in the utilization of skilled delivery. Table 2 presented the distribution of women according to skilled delivery care service utilization by different predisposing and enabling factors. Of the total 6,641 births, only 15.6% were assisted by SBAs, while the remaining 84.4% delivered without any assistance by SBAs. With regard to the association of the predictors with service utilization, the Chi-square association test showed that all the predictors considered in the study were significantly associated with utilization of skilled delivery in both rural and urban samples. Skilled assisted includes doctor, nurse, and midwife.

**Results of Bayesian logistic regression analysis**

In this study, two separate models for urban and rural samples were fitted to see the determinants of utilization of skilled delivery services among women aged 15-49 who had at least one birth, five years preceding the 2011 EDHS. The first model (Rural Model) was fitted to identify the determinants of utilization of skilled delivery for rural women. The Second model (Urban Model) demonstrates the key predictors of utilization of Skilled delivery among women living in urban Ethiopia.

As indicated in Table 3, in rural women’s sample, age of the women was not statistically significant while it significantly contributed to utilization of skilled delivery among women residing in urban Ethiopia. Accordingly, urban women in age group of 25-34 years and 35-49 have 43% and 107% higher odds of receiving assistance from SBAs than women in the age group of 15-24, respectively (table 3).
The odds of receiving assistance from SBAs among women living in rural areas and belonging to richer and the richest wealth group were 2.01 and 3.09 times higher, respectively compared to those from poorest wealth quintile. Similarly, women from urban areas who belonged to richer and the richest wealth group were 1.71 and 3.38 times higher, respectively compared to women from poorest wealth quintile. The likelihood of receiving skilled assistance during delivery is 3.06 and 4.16 times higher for women who attended ANC in urban and rural areas, respectively, than women who did not attend ANC (Table 3).

Discussion

This study examined the urban-rural differentials in the status and predictors of utilization of SBAs based on a total of 6,644 sample women. It was observed that about 15.6% of the women attended skilled assistance during delivery. The level of use of maternal health services noted here is one of the lowest compared to Sub-Saharan African countries, such as Cameroon (62%), Senegal (62%), Malawi (57%), and Lesotho (52%), (Macro International, 2007).

Results of the analysis of Bayesian logistic regression showed that different socio-economic and demographic variables associated strongly with women's use of skilled delivery care services in both urban and rural areas.

One of the predisposing demographic factors considered in this study was women's age. Although its association with utilization of skilled delivery in the rural sample was not statistically significant, it was observed that there was positive relationship between age and use of SBAs in urban sample. Contrary to women's age, birth order was found to have a strong negative association with the use of SBAs during delivery in both urban and rural women. With regard to predisposing factors; parental education, husband's and women's education emerged as weak predictors of the use of skilled assistance at delivery among urban and rural women. Likewise, it was observed that women's exposure to media and women's autonomy to be statistically not significant factors to influence rural women's tendency towards utilizing skilled delivery.

Previous studies documented that women's education is a major factor influencing maternal health service utilization. Education also serves as proxy for information and knowledge of available health care services. A significant negative association was seen between higher birth order and the use of SBAs at delivery in both urban and rural sample. These findings concur with several other studies that came up with negative association between higher birth order and the use of skilled delivery assistance. This association can be explained by fear of complication or lack of confidence among women who experience first birth and thus, are more likely to use SBAs at delivery than among those with higher birth order. Conversely, women with more children believe that they are more experienced to give birth safely and hence, are less likely to use skilled assistance during delivery. The use of SBAs during delivery among women with high number of children could also be due to resource constraints in the family as there are many demands in the family (Mekonnen et al. 2003).

Women's occupation was found to be statistically not significant predictor in influencing utilization of assistance from SBAs in both rural and urban sample. Nevertheless, women in urban sample whose husbands worked in skilled work such as business and services secondary or higher education have 1.94 times higher odds of using assistance from SBAs compared to women with uneducated husband. However, urban women whose husband's attended primary school didn't have a statistically significant variation in receiving assistance from SBAs compared to women whose husband's attended no education. Unlike the results of Bivariate analysis, the influence of women's occupation on utilization of assistance from SBAs during delivery was not statistically significant in both urban and rural women. Likewise, among women in rural sample, husband's occupation didn't show statistically significant association with use of skilled delivery care services.

Table 3. Results of Bayesian Logistic Regression for Urban and Rural Sample, Ethiopia

<table>
<thead>
<tr>
<th>Variable</th>
<th>Odds Ratio</th>
<th>(95% Confidence Intervals)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of women</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-24</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>25-34</td>
<td>1.45</td>
<td>(0.99, 2.13)</td>
</tr>
<tr>
<td>35-49</td>
<td>2.07</td>
<td>(1.19, 3.64)</td>
</tr>
<tr>
<td>Parity</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>2-3</td>
<td>0.59</td>
<td>(0.25, 0.94)</td>
</tr>
<tr>
<td>3-5</td>
<td>0.18</td>
<td>(0.10, 0.32)</td>
</tr>
<tr>
<td>Women's educational status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No education</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Primary education</td>
<td>1.45</td>
<td>(1.04, 1.92)</td>
</tr>
<tr>
<td>Secondary/Higher</td>
<td>2.28</td>
<td>(1.37, 3.83)</td>
</tr>
<tr>
<td>Husband's educational status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No education</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Primary education</td>
<td>1.54</td>
<td>(1.03, 2.32)</td>
</tr>
<tr>
<td>Secondary/Higher</td>
<td>1.94</td>
<td>(1.21, 3.30)</td>
</tr>
<tr>
<td>Respondent's occupation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unskilled</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Skilled</td>
<td>1.08</td>
<td>(0.80, 1.46)</td>
</tr>
<tr>
<td>Husband's occupation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unskilled</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Skilled</td>
<td>2.21</td>
<td>(1.49, 3.30)</td>
</tr>
<tr>
<td>Religion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orthodox</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Protestant</td>
<td>0.84</td>
<td>(0.51, 1.34)</td>
</tr>
<tr>
<td>Muslim</td>
<td>0.88</td>
<td>(0.63, 1.22)</td>
</tr>
<tr>
<td>Others</td>
<td>1.09</td>
<td>(0.24, 1.39)</td>
</tr>
<tr>
<td>Women's exposure to media</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less frequently</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>More frequently</td>
<td>1.56</td>
<td>(1.13, 2.15)</td>
</tr>
<tr>
<td>Women's decision making</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less</td>
<td>1.00</td>
<td></td>
</tr>
</tbody>
</table>

Women in rural and urban areas who attended secondary or higher education were 5.22 and 2.28 times more likely to receive assistance from SBAs during delivery compared to those with no education (Table 3). In the case of rural women, the influence of partner's education on utilization of skilled delivery was not statistically significant. Conversely, Table 3 showed that women from urban areas whose husband's attended education served as a proxy for information and knowledge of available health care services. The study revealed that husband's education is statistically not significant predictor of the utilization of SBAs during delivery among rural women. In the case of urban women sample, statistically significant difference was observed only for those women whose husband's attained secondary or higher education. This finding conforms to other previous studies in Ethiopia and other countries. It is likely that educated partners will have a better understanding and knowledge of modern health care services. Education also leads to better awareness about available services.

The study was not statistically significant predictor of utilization of SBAs based on a total of 6,644 sample women. It was observed that about 15.6% of the women attended skilled assistance during delivery. The level of use of maternal health services noted here is one of the lowest compared to Sub-Saharan African countries, such as Cameroon (62%), Senegal (62%), Malawi (57%), and Lesotho (52%), (Macro International, 2007).

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Women's occupation was found to be statistically not significant predictor in influencing utilization of assistance from SBAs in both rural and urban sample. Nevertheless, women in urban sample whose husbands worked in skilled work such as business and services secondary or higher education have 1.94 times higher odds of using assistance from SBAs compared to women with uneducated husband. However, urban women whose husband's attended primary school didn't have a statistically significant variation in receiving assistance from SBAs compared to women whose husband's attended no education. Unlike the results of Bivariate analysis, the influence of women's occupation on utilization of assistance from SBAs during delivery was not statistically significant in both urban and rural women. Likewise, among women in rural sample, husband's occupation didn't show statistically significant association with use of skilled delivery care services.
were found to be more likely to use SBAs during delivery compared to the women whose husbands involved in unskilled work. This finding is consistent with a study conducted in Ethiopia and Bangladesh indicating husband's occupation as a significant predictor to use skilled assistance at delivery (Tsegay et al, 2013 and Chakraborty et al, 2002). Husband's occupation also serves as proxy for household economic status. As a result, as the household economic status increases, the women's tendency towards using skilled assistance at delivery also increases.

In this study, religion emerged as a weak predictor of utilization of skilled assistance. The finding was consistent with study conducted by Mehari, 2013, who analyzed the EDHS 2000 and 2005 and come with weak association of women's religion and utilization of skilled delivery care services. Contrary to this finding, studies in Ethiopia and other countries found significant association between religion and skilled delivery service utilization needs further studies to ascertain.

The likelihood of skilled delivery service utilization among women in the poorer and middle wealth quintile compared to women in the poorest wealth quintile was not statistically significant among both urban and rural women.

Exposure to media was influential factor of delivery service utilization among women in urban areas. This finding concurs with another study in Ethiopia which analyzed EDHS 2000 and 2005 (Mehari, 2013). Thus, as to how religion influences skilled delivery service utilization needs further studies to ascertain.

Conclusion and policy implications

Despite the efforts that have been made in recent years to improve maternal health outcomes in Ethiopia, the proportion of women who receive assistance from SBAs is still unacceptably low. This study has identified a number of important factors that influence the use of skilled assistance during delivery. These predictors vary in urban and rural areas despite the fact that some of them have appeared important variables in both samples.

The strong relationship between education and the outcome variable implies that informal adult education for women and men can be employed as an immediate intervention to provide basic education and to increase awareness about basic maternity care. In line with this, raising awareness about the use of SBAs among women and men through mass media, religious leaders and community elders should be given due attention. The study has also concluded that large proportion of rural women do not use SBAs even after receiving ANC services, implying that there is a need to enhance the delivery assistance services once access is not a constraint.

References


